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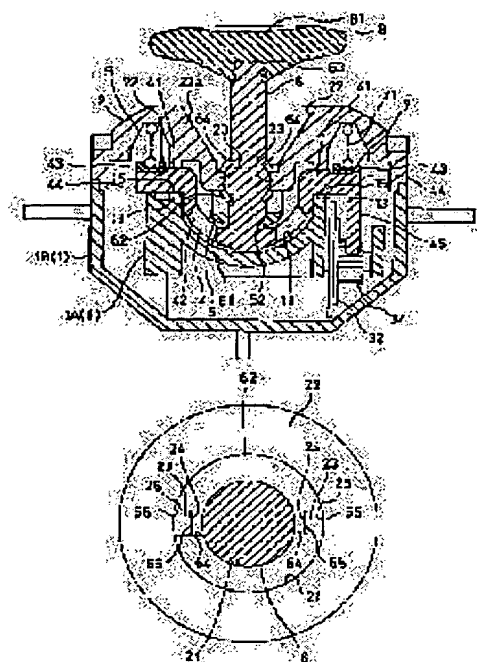
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(54) **JOYSTICK TYPE OPERATION MECHANISM FOR ELECTRONIC PARTS**



(57)Abstract:

PROBLEM TO BE SOLVED: To surely prevent the dust from entering the inside of a case by providing a rotation prevention mechanism at the contact part between the ball part of an operation shaft and the edge of a hole part of a case.

SOLUTION: An operation shaft 6 which is held in a neutral state by the force of a spring body 71 can oscillate around the shaft centers of bosses 23 and 23 against the spring force via the operation of an operation knob 8. When the shaft 6 oscillates at the optional positions around the shaft centers of both bosses 23, a ball part 62 can revolve in its parallel direction with the bosses 23 and 23 fitting in the groove parts 64 and 64 used as guides and the shaft 6 also can oscillate in its right-left direction against the front-back direction. Thus the shaft 6 can freely oscillates in all directions around its ball part 62. On the other hand, the part 62 touches the edge of a hole part 21 of a cover 2 and also the bosses 23 of the cover 2 are fit in the groove parts 64 of the ball part 62 to always touch the groove bottom parts 65 and a groove 66. Therefore, no gap is produced between the shaft 6 projected from the part 21 and the cover 2. Thus no dust enters the inside of the cover 2.

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[Claim(s)]

[Claim 1] The rocking member of the pair which a pivot is prepared in the case where it has 2 sets of bearings bearings and an axial center cross at right angles mutually, and an edge, and is equipped with a long long hole in the direction of an axial center of the pivot, The electronic parts which are interlocked with each of those rocking members at each \*\*, and demonstrate a function, It has covering with which the above-mentioned case is equipped, an actuation shaft, and the spring object which always from-cartridge-energizes this actuation shaft in the neutral condition. Each pivot of the above-mentioned rocking member of the pair which the longitudinal direction of a long hole was made to intersect perpendicularly mutually, and was arranged in the shape of a lap On the above-mentioned actuation shaft which was supported by 2 sets of bearings of a

case free [ rocking to each \*\* ], and was inserted in each long hole of the above-mentioned rocking member of a pair. The projection which hangs on one of rocking members and \*\*\*\*\* the actuation shaft concerned is prepared. The joy stick mold actuation device of the electronic parts characterized by preparing the bulb which this actuation shaft was projected through the pore prepared in the above-mentioned covering, and contacted the hole edge of the above-mentioned pore at this actuation shaft, and was supported free [ omnidirection rocking ] by using that contact part as the supporting point.

[Claim 2] The joy stick mold actuation device of electronic parts according to claim 1 in which the niting device which prevents that an actuation shaft rotates to the circumference of the axial center is prepared in the contact part with the hole edge of a bulb and the pore in covering.

[Claim 3] the slot where a niting device is formed in the bulb of an actuation shaft, and is prolonged in the direction of a parallel, and the circular boss by whom was projected and made into path inboard, and contacted the pore of covering for the groove face side and groove bottom side of the above-mentioned slot, enabling free sliding, and fitting was done to it -- since -- the joy stick mold actuation device of the becoming electronic parts according to claim 2.

[Claim 4] the inner case in which the case was equipped with 2 sets of bearings -- among these, the joy stick mold actuation device of electronic parts given in claim 1 which has been divided into the outside case where a case is held and by which covering is put on the outside case, claim 2, or claim 3.

[Claim 5] A circular pore is prepared in the center section of covering, and it has become the taper wall with which the perimeter wall of the pore falls toward the pore, and serves as inclination. The flat side included in the neutral condition of an actuation shaft in the same horizontal plane is formed in each edge of the rocking member of a pair. A spring object The joy stick mold actuation device of the electronic parts according to claim 1 which are held in the space around the above-mentioned taper wall, and intervene between the above-mentioned

covering and each above-mentioned flat side.

[Claim 6] The joy stick mold actuation device of the electronic parts according to claim 5 which the push-down member equipped with the field which becomes level in the neutral condition of an actuation shaft between the lower limit of a spring object and each flat side of the rocking member of a pair is arranged, it depresses in the neutral condition of an actuation shaft, and the above-mentioned field of a member and each above-mentioned flat side of the rocking member of a pair carry out field contact mutually, and overlap.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the joy stick mold actuation device of electronic parts in which the function of electronic parts is demonstrated, by carrying out rocking actuation of the actuation shaft (stick) in the direction of arbitration.

[0002]

[Description of the Prior Art] The conventional example of the joy stick mold actuation device of electronic parts is indicated by JP,2-68404,U. While the rocking member of a pair equipped with a long hole makes the longitudinal direction of those long holes intersect perpendicularly mutually and is arranged, this kind of joy stick mold actuation device Generally the actuation shaft which the electronic parts which are interlocked with each of those rocking members at each \*\*, and demonstrate a function were prepared, and was established free [ omnidirection rocking ] by using a predetermined part as the supporting point is equipped with the configuration of being inserted in each long hole of the above-mentioned rocking member of a pair. Moreover, the rocking member and electronic parts of a pair are held in the case, and the above-mentioned actuation shaft has projected from the predetermined part of covering with which the case was equipped.

[0003]

[Problem(s) to be Solved by the Invention] however, in what is indicated by the above-mentioned official report By attaching in the rocking member the lower limit section of the actuation shaft inserted in the long hole of one rocking member of the rocking members of a pair through the shaft which intersects perpendicularly to the longitudinal direction of the long hole The configuration of preventing rotation of the circumference of the extract of an actuation shaft and the shaft of an actuation shaft is adopted, and the rocking supporting point when operating an actuation shaft has become the location of the above-mentioned shaft which has attached the lower limit section of an actuation shaft in the rocking member. For this reason, in the part where the above-mentioned actuation shaft of covering which holds the rocking member of a pair projects, in order to secure the rocking range of an actuation shaft, it becomes indispensable to prepare comparatively big opening.

[0004] However, since dust and dust may go into the interior from the opening when opening is prepared in covering, the operational reliability of the rotating part of a joy stick mold actuation device or a sliding part will be spoiled.

[0005] It aims at offering the joy stick mold actuation device of the electronic parts which can prevent invasion of the dust inside a case, or dust certainly, this invention being made under the above situation and being able to prevent certainly rotation of the circumference of the extract of an actuation shaft, or the shaft of an actuation shaft.

[0006]

[Means for Solving the Problem] The joy stick mold actuation device of the electronic parts by invention concerning claim 1 The rocking member of the pair which a pivot is prepared in the case where it has 2 sets of bearings bearings and an axial center cross at right angles mutually, and an edge, and is equipped with a long long hole in the direction of an axial center of the pivot, The electronic parts which are interlocked with each of those rocking members at each \*\*, and demonstrate a function, It has covering with which the above-mentioned case is

equipped, an actuation shaft, and the spring object which always from-cartridge-energizes this actuation shaft in the neutral condition. Each pivot of the above-mentioned rocking member of the pair which the longitudinal direction of a long hole was made to intersect perpendicularly mutually, and was arranged in the shape of a lap On the above-mentioned actuation shaft which was supported by 2 sets of bearings of a case free [ rocking to each \*\* ], and was inserted in each long hole of the above-mentioned rocking member of a pair The projection which hangs on one of rocking members and \*\*\*\*\* the actuation shaft concerned is prepared. This actuation shaft is projected through the pore prepared in the above-mentioned covering, and the bulb which contacted the hole edge of the above-mentioned pore and was supported by this actuation shaft free [ omnidirection rocking ] by using that contact part as the supporting point is prepared.

[0007] In the joy stick mold actuation device which adopted this configuration, it is desirable to adopt the configuration that the niting device which prevents that an actuation shaft rotates to the circumference of that axial center is prepared in the contact part with the hole edge of a bulb and the pore in covering like invention concerning claim 2.

[0008] The projection prepared in the actuation shaft hangs on the rocking member of the pair supported by bearing of a case through the pivot as it is the configuration indicated to claim 1 or claim 2, and an actuation shaft is \*\*\*\*\* (ed). Moreover, the rotation in the circumference of the axial center of an actuation shaft is prevented by the niting device. And since this niting device is prepared in the contact part with the hole edge of the bulb of an actuation shaft, and the pore by the side of a case, it is not necessary to prepare opening by which dust and dust may trespass upon the part where an actuation shaft projects from a case.

[0009] the slot which is formed in the bulb of an actuation shaft and extends in the direction of a parallel like invention concerning claim 3 as the above-mentioned niting device, and the circular boss by whom was projected and made into path

inboard, and contacted the pore of covering for the groove face side and groove bottom side of the above-mentioned slot, enabling free sliding, and fitting was done to it -- since -- the concrete configuration of becoming is employable.

[0010] If the thing of this configuration is adopted as a niting device, since the hole edge of the pore by the side of covering will contact the front face of the bulb of an actuation shaft and the boss section by the side of covering will contact the groove face side and groove bottom side of a slot of the above-mentioned bulb in the part where an actuation shaft projects from a case, even the clearance upon which that part is taken up completely and dust and dust trespass is no longer formed.

[0011] Moreover, like invention concerning claim 4, the case is divided into the inner case equipped with 2 sets of bearings, and the outside case where this inner case is held, and can adopt the configuration that covering is put on the outside case.

[0012] If this configuration is adopted, since the device sections, such as an inner case and a rocking member, can be made to hold in the space sealed with an outside case and covering, invasion of dust or dust can be lost.

[0013] Furthermore, a circular pore is prepared in the center section of covering like invention concerning claim 5. It is the taper wall with which the perimeter wall of the pore falls toward the pore, and serves as inclination. The flat side included in the neutral condition of an actuation shaft in the same horizontal plane is formed in each edge of the rocking member of a pair, and the configuration of holding in the space around the above-mentioned taper wall, and intervening between the above-mentioned covering and each above-mentioned flat side can be used for a spring object. And it is desirable in a push-down member equipped with the field which becomes level in the neutral condition of an actuation shaft like invention concerning claim 6 between the lower limit of a spring object and each flat side of the rocking member of a pair being arranged, depressing in the neutral condition of an actuation shaft, and the above-mentioned field of a



member and each above-mentioned flat side of the rocking member of a pair carrying out field contact mutually, and overlapping in that case.

[0014] If constituted like invention concerning claim 5, since the space around the taper wall of covering will be used effectively as hold space of a spring object, it becomes unnecessary to secure the hold space of a spring object separately between covering and a case, and a miniaturization is promoted so much. And if constituted like invention concerning especially claim 6, since the force of a spring object will depress and it will join each flat side of the rocking member of a pair uniformly through a member, the return dependability to the neutral condition of an actuation shaft improves.

[0015]

[Embodiment of the Invention] One operation gestalt of the electronic parts built over this invention with reference to drawing 1 - drawing 9 is explained. The whole perspective view showing the appearance of the joy stick mold actuation device of the electronic parts which drawing 1 requires for this invention, The decomposition perspective view in which the perspective view which drawing 2 omitted the device section F of the above-mentioned actuation device in part, and was shown, drawing 3 , drawing 4 , and drawing 5 showed the component part of the above-mentioned actuation device, The top view which drawing 6 omits covering 2 and the actuation shaft 6 in the above-mentioned actuation device of drawing 1 , and is shown, the sectional view where drawing 7 meets the VII-VII line of drawing 1 , the sectional view where drawing 8 meets the VIII-VIII line of drawing 1 , and drawing 9 are fragmentary sectional views which meet the IX-IX line of drawing 1 .

[0016] Housing which holds the device section F which showed the illustrated joy stick mold actuation device to drawing 2 with a case 1 and covering 2 was formed, and the case 1 is divided into inner case 1A and outside case 1B.

[0017] Like drawing 2 , drawing 3 and drawing 6 - drawing 8 , inner case 1A has the reentrant 11 of a bowl form in the center section, separates include-angle

spacing whose knock-out-plate sections 12, 12, 13, and 13 of a lot are 90 degrees in a pair to the perimeter of this reentrant 11, and is prepared in it, and the bearings 14, 14, 15, and 15 which carried out the reentrant to the shape of radii at each of those knock-out-plate sections 12, 12, 13, and 13 are formed. What are prepared in the knock-out-plate sections 12 and 12 of the pair lot which carries out phase opposite, or 13 and 13 makes a lot, these bearings 14, 14, 15, and 15 are arranged on the same axis, and 2 sets of such bearings 14 and 14 or the axial center of 15 and 15 lies at right angles mutually on the same height level. Moreover, it is supported free [ rotation of the impellers 31 and 32 with which the side-face side of inner case 1A and a revolving-shaft alignment cross at right angles mutually ], and gearings 33 and 34 are attached to each impeller 31 and 32.

[0018] 4 and 5 are rocking members. Like drawing 2 , drawing 3 , and drawing 7 , while one rocking member 4 becomes by the circular member which equips a longitudinal direction with the long long hole 42 and pivots 41 and 41 are formed in the both ends, the axis end sections 44 and 44 which equipped those pivots 41 and 41 with the flat sides 43 and 43 extend, and the sector gearing 45 is formed in the axis end section 44 of one side. Although the rocking member 5 of another side differs from one rocking member 4 at the point constituted by the circular member with radius of curvature smaller than one rocking member 4, it has the same composition as abbreviation in respect of others. That is, for a pivot and 52, as for a flat side and 54, a long hole and 53 are [ 51 and 51 / the axis end section and 55 ] gearings.

[0019] Like drawing 6 - drawing 8 , by inserting those pivots 41, 41, 51, and 51 in 2 sets of bearings 14, 14, 15, and 15 of inner case 1A at each \*\*, and making them support free [ rocking ], the rocking members 4 and 5 of a pair separate spacing, and are arranged in the shape of a lap so that the longitudinal direction of long holes 42 and 52 may intersect perpendicularly mutually. In this way, the sector gearings 45 and 55 are clenched by the gearings 33 and 34 of the

impellers 31 and 32 of the pair prepared in inner case 1A in the rocking members 4 and 5 of the pair attached in inner case 1A. Moreover, each of the above-mentioned flat sides 43 and 53 is contained in the neutral condition of the actuation shaft 6 mentioned later in the same horizontal plane.

[0020] Like drawing 3 , the actuation shaft 6 equipped the end section with the projection 61 which projected in the direction of the outside of a path, pars intermedia was equipped with the bulb 62, the other end is equipped with the connection section 63, and the slots 64 and 64 which extend in the direction of a parallel are formed in the part separated 180 degrees at the above-mentioned bulb 62. Moreover, it shakes to long holes 42 and 52 preferably, and the diameter of the actuation shaft 6 has a dimension which is not larger than the minor-axis dimension of the long holes 42 and 52 of the above-mentioned rocking members 4 and 5, and a dimension [ be / nothing ] which may be inserted possible [ sliding ]. And like drawing 7 or drawing 8 , the end section of the actuation shaft 6 is \*\*\*\*(ed) by each long holes 42 and 52 of the rocking members 4 and 5 of a pair, and the projection 61 fits into the long hole 42 of the lower rocking member 4. For this reason, in this actuation shaft 6, the protrusion direction of the above-mentioned projection 61 becomes in the direction which intersects perpendicularly with the longitudinal direction of the long hole 52 of the rocking member 5 of the bottom attached in inner case 1A, when the actuation shaft 6 is pulled up by this all over drawing, projection 61 hangs on the upper rocking member 5, and the actuation shaft 6 is \*\*\*\*\* (ed) by it.

[0021] The device section F (however, the illustration abbreviation has been carried out about the upper rocking member 5) assembled like drawing 2 is held in outside case 1B shown in drawing 4 . In the device section F held in outside case 1B, inner case 1A is fixed to outside case 1B with the proper means of the screw which is not illustrated. In this way, where the device section F is attached in outside case 1B, a light emitting device, a photo detector (un-illustrating), etc. which are arranged at the outside case 1B side counter to two impellers 31 and

32. In addition, in the device section F, the height level of the rocking axial center (pivots 41 and 51) of the rocking members 4 and 5 and the height level of the core of the bulb 62 of the actuation shaft 6 are in agreement. Moreover, the substrate 110 which connected the flexible patchboard 100 is built into outside case 1B, and the above-mentioned light emitting device and the photo detector are electrically connected to the circuit pattern of this substrate 110.

[0022] In the device section F attached in outside case 1B, the ring 7 with a slot is constructed on the above-mentioned flat sides 43 and 53 with which the rocking members 4 and 5 of a pair are equipped, and the spring object 71 which becomes with coiled spring is arranged on this ring 7 with a slot so that drawing 5 , drawing 7 , and drawing 8 may show. The ring 7 with a slot is instantiation of a push-down member, and in the neutral condition of the actuation shaft 6, the inferior surface of tongue 72 becomes level, the inferior surface of tongue 72 and the above-mentioned flat sides 43 and 53 carry out field contact mutually, and they overlap.

[0023] Like drawing 5 , covering 2 serves as the taper side 22 which the perimeter of a pore 21 falls toward the pore 21, and serves as inclination while having the circular pore 21 in the center section. And the taper side 22 is formed of the top face of taper wall 22a (refer to drawing 7 and drawing 8 ) equivalent to the perimeter wall of a pore 21. Here, the above-mentioned spring object 71 is held in the space S around taper wall 22a, and intervenes through the ring 7 with a slot between the above-mentioned covering 2 and each above-mentioned flat side 43 and 53. Therefore, \*\*\*\* for which the space S around taper wall 22a of covering 2 is used effectively as hold space of the spring object 71, and its space S do not become useless. the periphery diameter of the bulb 62 of the actuation shaft 6 which described the diameter of a pore 21 above, and abbreviation -- it has the same dimension. And when the covering 2 which \*\*\*\*(ed) the pore 21 on the actuation shaft 6 is put on the outside case 1, the hole edge of a pore 21 contacts the bulb 62 of the actuation shaft 6 like drawing 8 , and the bulb 62 is supported

free [ omnidirection rocking ]. Moreover, the circular bosses 23 and 23 separated 180 degrees are projected by the pore 21 of covering 2 towards path inboard at two places, and these bosses 23 and 23 get into the slots 64 and 64 of the direction of a parallel established in the above-mentioned bulb 62 at each \*\*. These bosses' 23 and 23 axial center is in agreement with the rocking axial center of the above-mentioned rocking members 4 and 5 of a pair. And the apical surfaces 24 and 24 contact the groove bottom sides 65 and 65 of the shape of radii of the above-mentioned slots 64 and 64, enabling free sliding, and the circular bosses 23 and 23 are [ the peripheral face 25 and the groove face sides 66 and 66 of 25 fang-furrow sections 64 and 64 ] in contact [ enabling free sliding ] so that it may understand by drawing 9 .

[0024] If the bosses 23 and 23 by the side of covering 2 get into the slots 64 and 64 of the direction of a parallel of a bulb 62 in the above-mentioned condition, although the actuation shaft 6 can be rocked to the circumference of bosses' 23 and 23 axial center, it cannot be rotated to the circumference of the axial center of actuation shaft 6 the very thing. Therefore, the niting device which prevents that the actuation shaft 6 rotates to the circumference of the axial center by the slots 64 and 64 and bosses 23 and 23 of a bulb 62 is constituted.

[0025] Moreover, it was inserted between the ring 7 with spring object 71 fang furrow, and covering 2, and covering 2 is compressed, where outside case 1B is covered. Therefore, as for the flat sides 43 and 53 of the rocking members 4 and 5 of a pair, it is always pressed by the force of the spring object 71 through the ring 7 with a slot, it was always from-cartridge-energized so that the rocking members 4 and 5 of a pair might become the posture in which it inclines in neither of the directions, according to this press operation, consequently the actuation shaft 6 will always be from-cartridge-energized by the perpendicular posture, i.e., a neutral condition.

[0026] In drawing 5 , 8 is an actuation tongue. This actuation tongue 8 is attached in that actuation shaft 6 through the connection section 63 of the actuation shaft 6

like drawing 1 , drawing 7 , and drawing 8 . The actuation tongue 8 is equipped with the hollow 81 so that it may be easy to place the digiti manus.

[0027] In the joy stick mold actuation device constituted as mentioned above, the impellers 31 and 32, light emitting device, and photo detector which were mentioned above constitute the electronic parts of a rotating type. And if impellers 31 and 32 rotate according to the rocking include angle of the rocking members 4 and 5, the pulse according to the rotation of those impellers 31 and 32 will be outputted, and the pulse will be used as a coordinate signal in the X-axis or Y shaft orientation.

[0028] Next, an operation is explained.

[0029] the actuation shaft 6 currently held according to the force of the spring object 71 at the neutral condition operates the actuation tongue 8 with a finger -- it is possible to resist the force of the spring object 71 and to make it rock to the circumference of the above-mentioned bosses' 23 and 23 axial center (this is considered as rocking of a cross direction). Moreover, since a bulb 62 can rotate in the direction of a parallel by considering the bosses 23 and 23 who have got into slots 64 and 64 as a guide while the actuation shaft 6 is rocking in the location of the arbitration of the circumference of bosses' 23 and 23 axial center, a longitudinal direction can be made to rock the actuation shaft 6 to the above-mentioned cross direction. Therefore, omnidirection rocking is free focusing on the bulb 62 of the actuation shaft 6. And if a finger is lifted from the actuation shaft 6 after making the actuation shaft 6 rock in the direction of arbitration, propagation and the actuation shaft 6 will return [ the force of the spring object 71 ] to the actuation shaft 6 through the rocking members 4 and 5 of a pair at a neutral condition. In this case, since it joins uniformly each flat side 43 and 53 of the rocking members 4 and 5 of a pair through the ring 7 with a force fang furrow of the spring object 71, the return dependability to the neutral condition of the actuation shaft 6 improves.

[0030] Moreover, if the actuation shaft 6 is rocked in the direction of arbitration,

the rocking members 4 and 5 of a pair rock only the amount corresponding to the amount of rocking of the direction of X at that time, and the amount of rocking of the direction of Y to each \*\*, impellers 31 and 32 will rotate according to the rocking include angle of those rocking members 4 and 5, and the pulse according to the rotation will be outputted.

[0031] By the way, since the bulb 62 of the actuation shaft 6 touches the hole edge of the pore 21 by the side of covering 2, and the bosses 23 and 23 by the side of covering 2 get into the slot 64 of a bulb 62 and it is moreover always in contact with the groove bottom side 65 or the groove face side 66, a clearance does not exist between the actuation shafts 6 and coverings 2 which have projected from the pore 21. Therefore, dust and dust stop trespassing upon the interior, and the operational reliability in early stages of the rotating part of the device section F or a sliding part continues, and is maintained at a long period of time.

[0032] Although the case 1 is divided into inner case 1A and outside case 1B with the operation gestalt explained above, it is possible by forming bearings 14 and 15 in outside case 1B, or preparing electronic parts to omit inner case 1A. Therefore, it is not necessary to necessarily divide a case 1 into inner case 1A and outside case 1B.

[0033] Although the configuration of always pressing the flat sides 43 and 53 of the rocking members 4 and 5 of a pair by the force of the spring object 71 through the ring 7 with a slot in the operation gestalt explained by drawing 1 - drawing 9 as a means to always from-cartridge-energize the actuation shaft 6 in the neutral condition has been adopted, it is also possible to adopt other configurations as a means to always from-cartridge-energize the actuation shaft 6 in the neutral condition.

[0034] The decomposition perspective view has shown the device section F about the operation gestalt which adopted other configurations as drawing 10 as a means to always from-cartridge-energize the actuation shaft 6 in the neutral

condition.

[0035] In the device section F of this drawing, the clearance-like hollows 16 and 17 are established in the lateral part of the knock-out-plate sections 12 and 13 in inner case 1A, respectively. Since other configurations of inner case 1A are the same as that of what was explained by drawing 3 etc., the same sign has been given to the same or the \*\*\*\*ing part.

[0036] Among the rocking members 4 and 5, the pivot 41 of one side of one rocking member 4 is extended in the direction of an axial center, that extension stem section 46 is countered, the protruding piece 47 is formed in one, and opening 48 is formed in this protruding piece 47. Moreover, the same is said of the rocking member 5 of another side, and the pivot 51 of one side is extended in the direction of an axial center, that extension stem section 56 is countered, the protruding piece 57 is formed in one, and opening 58 is formed in this protruding piece 57. Since other configurations of the rocking members 4 and 5 of a pair are the same as that of what was explained by drawing 3 etc., the same sign has been given to the same or the \*\*\*\*ing part.

[0037] 49 and 59 are spring objects which become with torsion coiled spring, and the edge of those spring objects 49 and 59 is formed as the legs 49a, 49b, 59a, and 59b of a linear pair.

[0038] About the actuation shaft 6, since it is the same structure as the actuation shaft 6 explained by drawing 3 etc., the same sign has been given to the same part.

[0039] In the device section F of drawing 10 , by inserting those pivots 41, 41, 51, and 51 in 2 sets of bearings 14, 14, 15, and 15 of inner case 1A at each \*\*, and making them support free [ rocking ], the rocking members 4 and 5 of a pair separate spacing, and are arranged in the shape of a lap so that the longitudinal direction of long holes 42 and 52 may intersect perpendicularly mutually. In this way, the sector gearings 45 and 55 are clenched by the gearings 33 and 34 of the impellers 31 and 32 of the pair prepared in inner case 1A in the rocking members



4 and 5 of the pair attached in inner case 1A.

[0040] Moreover, the legs 49a and 49b are inserted in the hollow 16 of inner case 1A through the opening 48 of a protruding piece 47, and \*\*\*\* and support it on the wall surfaces 16a and 16b (refer to drawing 11 ) which carry out phase opposite in the hollow 16 while fitting of one spring object 49 is carried out to the extension stem section 46 of one rocking member 4. Similarly, the legs 59a and 59b are inserted in the hollow 17 of inner case 1A through the opening 58 of a protruding piece 57, and \*\*\*\* and support it on the wall surface (un-illustrating) which carries out phase opposite in the hollow 17 while fitting of the spring object 59 of another side is carried out to the extension stem section 56 of the rocking member 5 of another side.

[0041] In the device section F explained by drawing 10 , the return operation to the neutral condition of the actuation shaft 6 with the spring object 49 is explained with reference to drawing 10 , drawing 11 , and drawing 12 .

[0042] When the actuation shaft 6 is rocked in neither of the directions from the neutral condition, like drawing 11 , the legs 49a and 49b of the pair of the spring object 49 maintained few gas holds up at the opening 48 of the protruding piece 47 of the rocking member 4, and have inserted the opening 48 in it. Therefore, the spring force has not joined a protruding piece 47.

[0043] If only the include angle theta which the actuation shaft 6 was leaned and the rocking member 4 showed to drawing 12 focusing on pivots 41 and 41 is rocked, since a protruding piece 47 will incline like drawing 12 united with the rocking member 4, one leg 49b is resisted and pushed on the force of the spring object 49 on the edge of the opening 48 of the protruding piece 47. Therefore, if a finger is lifted from the actuation shaft 6, in connection with propagation and its rocking member 4 returning [ the force of the spring object 49 ] to the rocking member 4 through leg 49b, the actuation shaft 6 will return to a neutral condition. It is also the same as when a finger is lifted from the actuation shaft 6 after the actuation shaft 6 was rocked by the opposite direction. Moreover, when a finger is

lifted from the actuation shaft 6 after the actuation shaft 6 was rocked in the direction which makes the rocking member 5 of another side rock, the same operation as the spring object 49 which the spring object 59 described above is demonstrated, and the actuation shaft 6 is returned to a neutral condition.

[0044] moreover, when the projection 61 of the actuation shaft 6 fits into the long hole 42 of the lower rocking member 4 like drawing 7 and the actuation shaft 6 is pulled up all over drawing with the operation gestalt explained by drawing 1 - drawing 9 Although projection 61 hangs on the upper rocking member 5 and the actuation shaft 6 is \*\*\*\*\* (ed), the projection 61 of the actuation shaft 6 is made to hang on the lower rocking member 4, and this point can also \*\*\*\*\* the actuation shaft 6. The operation gestalt made such is shown in drawing 13 . In the thing of this drawing, since the configuration and operation are the same as that of what was explained by drawing 1 - drawing 9 except making the projection 61 of the actuation shaft 6 hang on the lower rocking member 4, and \*\*\*\*\* (ing) the actuation shaft 6, by drawing 13 , duplication of explanation will be avoided [ the same as that of the part explained by drawing 1 - drawing 9 , or ] by \*\*\*\*\* which gives the same sign to the \*\*\*\*\*ing part.

[0045] Furthermore, the need of dividing a case 1 into inner case 1A and outside case 1B is necessarily unnecessary like the operation gestalt explained by drawing 1 - drawing 9 . A case 1 is made from a single member and the case 1 is made to have supported the pivot of the rocking member of a pair free [ rocking ] with the operation gestalt shown in drawing 14 . In addition, although the part which is supporting the pivot of the rocking member 4 has not appeared in drawing 14 , this point is the same as the configuration explained by drawing 7 . Since it is the same as that of the place explained by drawing 1 - drawing 9 , and drawing 13 also about other configurations and operations, duplication of explanation will be avoided [ the same or ] by \*\*\*\*\* which gives the same sign to the \*\*\*\*\*ing part.

[0046]

[Effect of the Invention] Since it is not necessary to prepare big opening for securing the rocking range of an actuation shaft to covering and the bulb of an actuation shaft moreover touches the hole edge of the pore by the side of covering according to this invention, it is lost that the protrusion part of the actuation shaft from covering is taken up, dust and dust invade from the part, and the operational reliability of a rotating part or a sliding part is spoiled. This effectiveness comes to be demonstrated much more certainly by invention concerning claim 3.

[0047] Moreover, the bulb of an actuation shaft uses the above-mentioned contact part as the supporting point, it is supported free [ omnidirection rocking ], and the niting device which prevents rotation of an actuation shaft is prepared in the contact part with the hole edge of the bulb and above-mentioned pore, and since it is the configuration which the projection of an actuation shaft hangs on a rocking member, rotation of an actuation shaft and an extract are prevented.

[0048] Since the space in which the rocking member is held is sealed with an outside case and covering according to invention concerning claim 4, not only the part where an actuation shaft projects from covering but the attach point of an outside case and covering can be certainly sealed now, and the effectiveness that the operational reliability of a rotating part which was described above, or a sliding part is spoiled neither with dust nor dust is demonstrated still more certainly.

[0049] According to invention which a miniaturization is promoted so much since the space around the taper wall of covering is used effectively as hold space of a spring object according to invention concerning claim 5, and relates to claim 6, it is effective in the force of a spring object depressing, coming to join each flat side of the rocking member of a pair uniformly through a member, and the return dependability to the neutral condition of an actuation shaft improving.

[Brief Description of the Drawings]

[Drawing 1] It is the whole perspective view showing the appearance of the joy

stick mold actuation device of the electronic parts concerning this invention.

[Drawing 2] It is the perspective view in which having omitted the device section F of the above-mentioned actuation device in part, and having shown it.

[Drawing 3] It is the decomposition perspective view having shown the inner case, the rocking member, and the actuation shaft.

[Drawing 4] It is the decomposition perspective view having shown the outside case, the substrate, etc.

[Drawing 5] It is the decomposition perspective view having shown a ring with a slot, a spring object, covering, etc.

[Drawing 6] It is the top view having omitted and shown covering 2 and the actuation shaft 6 in the actuation device of drawing 1 .

[Drawing 7] It is the sectional view which meets the VII-VII line of drawing 1 .

[Drawing 8] It is the sectional view which meets the VIII-VIII line of drawing 1 .

[Drawing 9] It is the fragmentary sectional view which meets the IX-IX line of drawing 1 .

[Drawing 10] It is the decomposition perspective view showing other operation gestalten of the device section.

[Drawing 11] It is the operation explanatory view of an important section in case the actuation shaft about the device section of drawing 10 is in a neutral condition.

[Drawing 12] It is the operation explanatory view of an important section when the actuation shaft about the device section of drawing 10 is rocking.

[Drawing 13] It is the sectional view of the joy stick mold actuation device in which made the projection of an actuation shaft hang on a lower rocking member, and the actuation shaft was \*\*\*\*\* (ed).

[Drawing 14] It is the sectional view of the joy stick mold actuation device which constituted the case from a single member.

[Description of Notations]

1 Case

1A Inner case

1B Outside case  
2 Covering  
4 Five Rocking member  
6 Actuation Shaft  
7 Ring with Slot (Push-Down Member)  
14 15 Bearing  
21 Pore  
22a Taper wall  
23 Boss (Niting Device)  
31 32 Impeller (electronic parts)  
41 51 Pivot  
42 52 Long hole  
43 53 Flat side  
61 Projection  
62 Bulb  
64 Slot (Niting Device)  
65 Groove Bottom Side  
66 Groove Face Side  
49, 59, 71 Spring object  
72 Inferior Surface of Tongue of Ring with Slot (Field of Push-Down Member)  
S Space around a taper wall